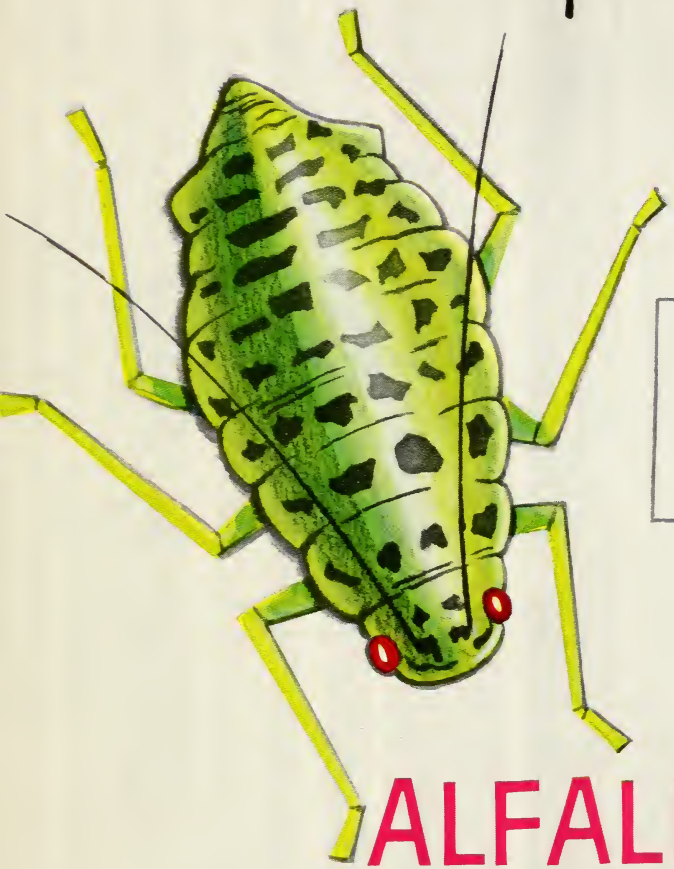
The spotted



ALFALFA APHID

HOW TO CONTROL IT

U. S. DEPARTMENT OF AGRICULTURE • LEAFLET NO. 422

The spotted ALFALFA APHID

HOW TO CONTROL IT

The spotted alfalfa aphid [1] is one of several kinds of aphids that attack alfalfa, clover, and other forage legumes. It damages alfalfa by sucking juice from the leaves and stems.

This insect is a pest of alfalfa in 38 States. It is especially destructive in States west of the Mississippi. It has been known to cause damage totaling more than $40 million in a single year.

You can control the spotted alfalfa aphid by applying an insecticide or by planting a variety of alfalfa that is resistant to the insect.

APPEARANCE

Spotted alfalfa aphids are pale yellow and have six or more rows of black spots along their backs. They are about one-sixteenth inch long.

The spotted alfalfa aphids commonly seen on alfalfa are female adults and their wingless young (nymphs). Males are rarely seen.

Most female adults are wingless. Those that are winged have smoky areas along the veins of the wings.

A winged adult, a wingless adult, and a nymph are illustrated in natural color on page 5.

DEVELOPMENT

Female spotted alfalfa aphids usually reproduce without mating, and give birth to living young. Each female produces 25 to 100 nymphs. In warm weather a female produces a nymph about every 6 hours. Activity is slowed by cold weather, but the female can reproduce during warm winter days.

Nymphs mature in 1 or 2 weeks when temperatures are high and in 3 or 4 weeks when the weather is cool. There may be 20 or more generations a year.

In the fall of 1960, true sexual forms of the aphid were found in an area in Nebraska. After mating, the females laid eggs which survived the winter and hatched the following spring.

Since 1960 these egg-laying forms have been found over a much larger part of Nebraska and in small areas in South Dakota, Kansas, Wisconsin, and Wyoming. This indicates that overwintering in the egg stage may become common in the North Central States. Adults or nymphs have not overwintered in the northern part of their range in the United States, though they are capable of surviving temperatures below freezing.

DAMAGE

Both the adults and the nymphs suck juice from alfalfa leaves and stems. The first sign of their feeding, seen in young alfalfa, is a

[1] *Therioaphis maculata.*

whitening of the veins of the leaves. Continued feeding causes the leaves to curl, turn yellow, die, and drop. In addition to feeding, the aphids inject a poison into the plants. This quickly kills seedlings, and it either stunts or retards the growth of older plants if it does not kill them.

Severely infested plants are defoliated; only a few leaves remain near terminals of the branches. The loss of leaves reduces hay and seed yields.

Aphid infestation thins a stand of alfalfa and shortens its life. The thinned stands are easily invaded by weeds, and the weakened plants are less able to withstand the attacks of injurious soil fungi on the roots. A severe infestation of aphids may ruin the stand. After the cutting of an infested stand, regrowth does not occur, or it is retarded.

Spotted alfalfa aphids usually feed on undersurfaces of leaves on the lower parts of the plant. In heavy infestations, they also feed on upper surfaces of leaves, on buds, and on stems. In warm weather aphids are active and move readily from one plant to another. Winged adults migrate from field to field. The aphids have the habit of jumping or dropping to the ground when infested plants are disturbed.

Whitened veins of leaves are a sign of early feeding by the spotted alfalfa aphid. (Courtesy of Copper's Farmer.)

Spotted alfalfa aphids secrete sticky honeydew that interferes with cutting, drying, and baling infested alfalfa. A black mold thrives on the honeydew, discoloring the plant and lowering the quality of hay.

PLANTS AFFECTED

The spotted alfalfa aphid causes extensive damage only to alfalfa. However, it feeds readily on burclover, black medic, and sourclovers. It also feeds on crimson clover, button clover, berseem clover, yellow-blossom sweetclover, and alsike clover. It can exist on several other legumes. This aphid does not care for red clover, Ladino clover, white Dutch clover, rose clover, subterranean clover, lespedeza, common vetch, purple vetch, birdsfoot trefoil, sesbania, or other sweetclovers.

WHEN TO APPLY INSECTICIDE

Start looking for aphid infestation as soon as alfalfa seedlings are out of the ground. Examine plants in various parts of the field. If you find an average of ½ to 1 aphid per seedling, apply an insecticide. If you find any aphids in the field, or if you know that they are in neighboring fields, it will pay you to examine your alfalfa every few days.

Alfalfa plant damaged by spotted alfalfa aphids. Soil around the plant is discolored by honeydew excreted by the aphids.

On older alfalfa, grown for hay or seed, watch for aphids and honeydew on the plants. Look on the undersurfaces of leaves, especially on lower parts of the plants. Go through your field and examine about 20 plants. If there is an average of 20 or more aphids per stem and honeydew is noticeable, apply an insecticide.

HOW TO APPLY INSECTICIDE

Apply an insecticide in a spray, using either ground equipment or an airplane.

Be sure that all alfalfa in the field is treated; any left untreated will harbor aphids that will reinfest treated alfalfa.

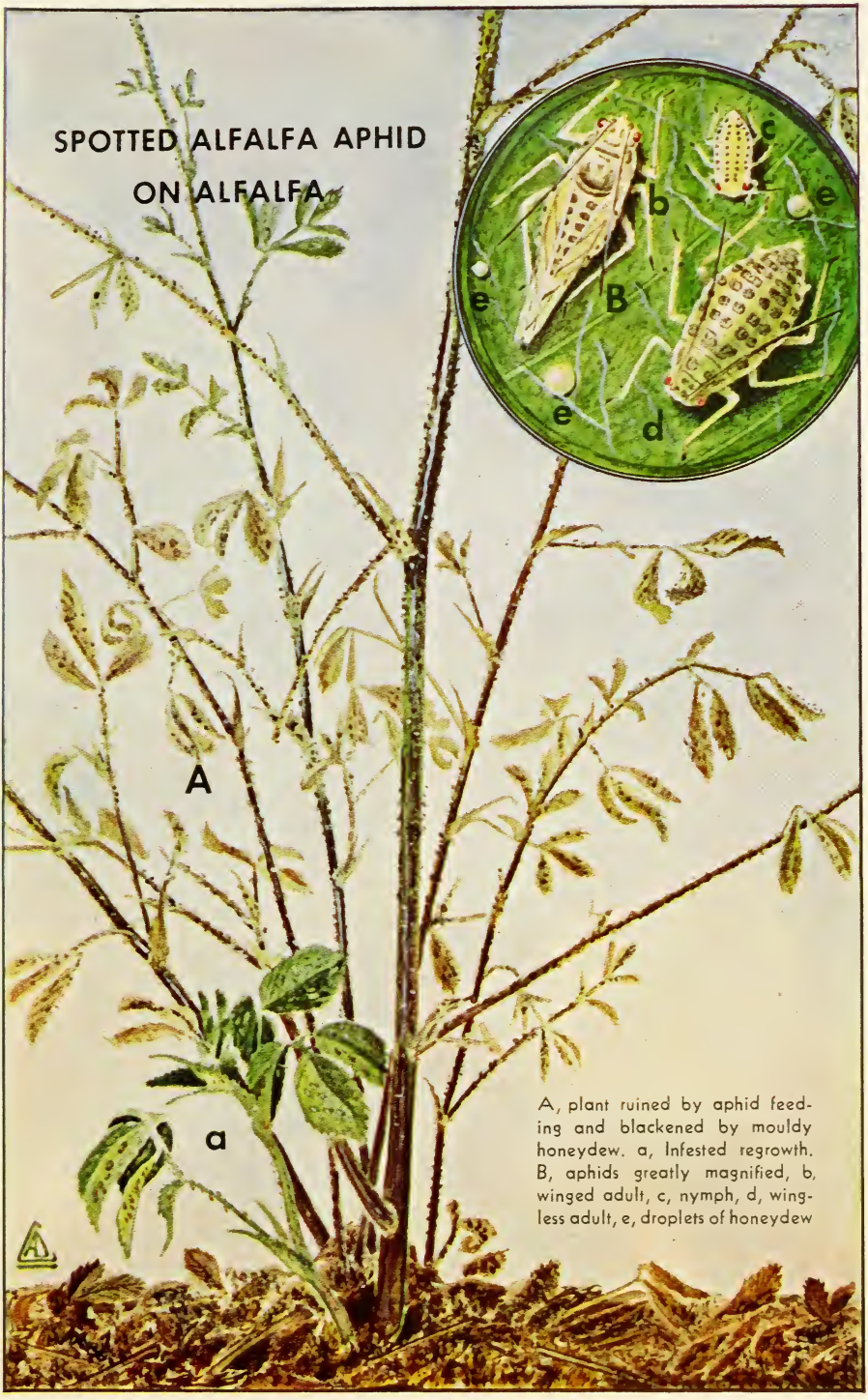
Insecticide is most effective if applied when the temperature is above 60° F.

You may spray alfalfa with demeton, diazinon, malathion, parathion, or mevinphos. Of these, demeton is the least harmful to insect pollinators and to predators and parasites of the spotted alfalfa aphid.

If your equipment has been used previously for applying a herbicide, clean it thoroughly before applying an insecticide.

If you use ground equipment, adjust it to apply spray at the rate of 12 or more gallons per acre; if you use an airplane, as little as 2 gallons per acre is sufficient.

Prepare a spray by mixing an emulsifiable concentrate with enough water to give the recommended per-acre dosage of *active ingredient*. The amount of water will be determined by the rate at which your equipment distributes



A, plant ruined by aphid feeding and blackened by mouldy honeydew. a, Infested regrowth. B, aphids greatly magnified, b, winged adult, c, nymph, d, wingless adult, e, droplets of honeydew

spray. For example: If your equipment is adjusted to distribute 12 gallons of spray per acre, and the recommendations specify 8 ounces of active ingredient per acre, you should mix the required amount of emulsifiable concentrate to provide 8 ounces of active ingredient with enough water to make 12 gallons of finished spray for each acre to be treated.

The recommended dosages are as follows:

Insecticide	*Amount of active ingredient to apply per acre* *Ounces*
Demeton	4
Diazinon	8
Malathion	10
Parathion	4
Mevinphos	2

NATURAL CONTROLS

Predators

Several insects feed on and kill the spotted alfalfa aphid. Usually they do not destroy enough aphids to control a serious infestation and prevent crop damage, but they may hold down light infestations and delay reinfestation after an insecticide application.

Adults and larvae of lady beetles are important natural enemies of aphids: the convergent lady beetle (*Hippodamia convergens*) is the most abundant. Larvae of syrphid flies and lacewing flies sometimes devour large numbers of spotted alfalfa aphids. Damsel bugs, big-eyed bugs, pirate bugs, and predaceous beetles and spiders destroy many aphids.

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Parasites

Native insect parasites of aphids in the United States have not commonly attacked the spotted alfalfa aphid. Therefore, three kinds of small wasps that parasitize aphids in Europe and Asia were imported, reared in large numbers, and released in infested States. They have become established in several States. Reports on two of these parasite species in certain areas of California and Arizona indicate that these parasites will be of considerable value in the control of the spotted alfalfa aphid.

Diseases

Fungus diseases attack the spotted alfalfa aphid in some areas, especially during wet spells or following irrigation. Under these conditions, and in the more humid areas of the country, fungus diseases may be of assistance by killing large numbers of aphids.

RESISTANT VARIETIES

Growing alfalfa varieties that are resistant to the spotted alfalfa aphid will reduce the damage caused by this insect. Seven such varieties are currently available.

Lahontan alfalfa was developed for resistance to other pests, but it is also resistant to the aphid. This

variety of alfalfa was released in 1954 by the U.S. Department of Agriculture and the Nevada and California Agricultural Experiment Stations for use in infested areas of Arizona, California, and Nevada where moderately hardy varieties of alfalfa are grown.

A resistant, nondormant variety named Moapa was released in 1957 by the U.S. Department of Agriculture and the Nevada, Arizona, and California Agricultural Experiment Stations. It is adapted to the arid, irrigated areas of the Southwest.

The New Mexico Agricultural Experiment Station released Zia alfalfa in 1958 for use in the infested areas of New Mexico.

Cody alfalfa was developed by the Kansas Agricultural Experiment Station and the U.S. Department of Agriculture and released in 1959. It is moderately hardy and is adapted to a 400-mile-wide belt extending from the Atlantic Ocean, through Kansas and Utah, northwest to the State of Washington.

Sonora alfalfa was developed by the Arizona, California, and Nevada Agricultural Experiment Stations and the U.S. Department of Agriculture and released in 1963. It is adapted to the lower desert areas of Arizona, California, and Nevada.

Mesa-Sirsa alfalfa was developed by the Arizona Agricultural Experiment Station and the U.S. Department of Agriculture and released late in 1965. It is adapted to the lower desert valley areas of the Southwest and is somewhat more resistant to the aphid than Sonora.

The Nevada Agricultural Experiment Station and the U.S. Department of Agriculture developed Washoe alfalfa and released it in 1966. This variety is also resistant to the pea aphid, another important alfalfa insect. Washoe is a winter-dormant variety best adapted to irrigated areas of the Pacific Coast and intermountain regions.

State and Federal plant breeders and entomologists are working to develop aphid resistant varieties adapted to other areas of the country. Ask your county agricultural agent or State agricultural experiment station for the lastest information on resistant varieties of alfalfa.

PRECAUTIONS

Insecticides used improperly can be injurious to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

Some States have special restrictions on the use of certain insecticides. Before applying insecticides, check State and local regulations.

Keep insecticides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them. Promptly dispose of empty insecticide containers; do not use for any other purpose.

When handling an insecticide, wear clean, dry clothing.

Avoid repeated or prolonged contact of insecticide with your skin.

Wear protective clothing and equipment if specified on the container label. Avoid prolonged inhalation of insecticide dusts or mists.

Avoid spilling an insecticide concentrate on your skin, and keep it out of your eyes, nose, and mouth. If you spill a concentrate on your skin, wash it off immediately with soap and water. If you

spill a concentrate on your clothing, remove clothing immediately and wash the skin thoroughly. Launder the clothing before wearing it again.

After handling an insecticide, do not eat, drink, or smoke until you have washed your hands and face. Wash any exposed skin immediately after applying an insecticide.

Avoid drift of insecticide to nearby wildlife habitats, bee yards, crops, or livestock. Do not apply insecticides under conditions favoring drift from the area to be treated.

Many insecticides are highly toxic to fish and aquatic animals. Keep insecticides out of all water sources such as ponds, streams, and wells. Do not clean spraying equipment or dump excess spray material near such water.

Do not apply insecticides to plants during hours when honey bees and other pollinating insects are visiting them.

Diazinon, malathion, parathion, and mevinphos are very toxic to bees. Do not apply these materials to alfalfa in bloom unless it is absolutely necessary and then only in the evening after the bees have left the field. Notify beekeepers at least 48 hours before spraying large acreages so that measures can be taken to protect the bees.

Have empty insecticide containers buried at a sanitary landfill dump, or crush and bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies. If you have trash-collection service, thoroughly wrap small containers in several layers of newspaper and place them in the trash can.

It is difficult to remove all traces of herbicides from equipment. For this reason, do not use the same equipment for applying herbicides that you use for insecticides and fungicides.

Parathion, demeton, and mevinphos are highly toxic and may be fatal if swallowed, inhaled, or absorbed through the skin. Be certain that the person who applies them is thoroughly familiar with their hazards, and will assume full responsibility for using them safely and complying with all precautions on the label. Wear a respirator of a type tested by the U.S. Department of Agriculture and found satisfactory for protection against the particular insecticide being used. A current list of acceptable respiratory devices is available from the Entomology Research Division, Agricultural Research Service, Beltsville, Md. 20705.

After applying one of the following insecticides, wait the indicated number of days before harvesting or grazing alfalfa: Demeton, 21 days; parathion, 15 days; mevinphos, 1 day. When using diazinon, wait 4 days before grazing and 10 days before cutting the hay. No waiting period is required for malathion.

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Agricultural Research Service

Washington, D.C. Revised August 1968

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 15 cents

U.S. GOVERNMENT PRINTING OFFICE: 1968